Money Isn't All You're Saving

Reduce System Costs with Right-Sized Ducts

Builder Guide

DESCRIPTION

A home builder's reputation rests not only on quality of construction, but on the quality of the comfort control (HVAC) system installed. Builders can expect to improve quality and customer satisfaction where HVAC subcontractors properly size duct systems.

A right-sized duct system meets the air distribution requirements of the house as closely as possible. HVAC contractors' can achieve right sized duct systems by following the procedures outlined in the Air-Conditioning Contractors of America (ACCA) Manual D and Manual J.

BENEFITS

Correctly sized ducts help avoid comfort complaints, a common builder callback. Keeping customers comfortable is key to achieving a reputation as a high quality home builder. Right-sized ducts provide improved comfort by supplying proper air distribution and quiet energy efficient operation.

Where building envelopes are tight and well insulated, it is no longer necessary to extend duct runs to the outer extremities of interior spaces. Short, compact duct systems provide high levels of comfort at a much reduced cost.

❑ Right-sizing ducts can reduce comfort complaints.

Properly sizing ducts can reduce home owner complaints that rooms are too warm or too cool compared with the rest of the house.

❑ Right-sized duct systems improve efficiency and reduce operating costs.

Duct systems and supply registers that are not matched properly with air flow requirements may cause inadequate air circulation in one or more rooms. For example, an oversized duct run can reduce the velocity of the air exiting the supply register. This often results in stratification - layers of different temperature air. Stratification can cause occupants to adjust their thermostat inefficiently to maintain comfort in rooms with poor air distribution. The result is increased operating hours for the HVAC unit and overheating or overcooling in unoccupied rooms. Properly sized ducts can solve this problem by delivering the right amount of air to all rooms evenly and efficiently.

❑ Right-sized duct systems operate more quietly.

Supply registers, return grilles, and ducts can be sources of unwanted noise from the HVAC system. Undersized duct systems can be noisy due to a high volume of air being pushed through an inadequate duct area. Properly sizing the ducts for required air flow improves the ability of the HVAC system to deliver the right amount of air with minimum noise.

INTEGRATION

❑ Avoid “rule-of-thumb” sizing calculations.

“Rule-of-thumb” sizing often results in a system that works, but is bigger than necessary, especially in energy efficient construction. Duct Sizing Worksheet (ACCA Manual D of equivalent) and Friction Rate Charts indicate whether velocities in runout ducts are acceptable. Sizing ducts properly the first time can reduce the occurrence of comfort complaints and costly callbacks.

❑ Proper duct sealing and insulation are also critical to HVAC efficiency

Duct leakage affects the efficiency of the HVAC system. Make sure contractors properly insulate ducts and provide proper fittings and sealant around the seams and joints to avoid leakage. Recent studies show that 15 to 35 percent of the heat produced by a furnace can be lost through ducts. See “More Efficient Duct Systems” factsheet for more details.

❑ Testing and balancing is important, too.

When the duct installation is completed, it is important to test, adjust, and balance the air flow. Balancing the air distribution system will help obtain the desired comfort levels and improve HVAC efficiency. A properly balanced air distribution system ensures that each room receives the desired amount of supply air. This reduces the chances of inefficient fan operation to meet the air flow requirements in the space.

RESOURCES

- ❑ Manual D Residential Duct Systems 2nd Edition, 1995. ACCA. Available at 202-483-9370.
- ❑ "Super Good Cents Builder's Field Guide" Bonneville Power Administration.1992

- ❑ See “More Efficient Duct Systems “, “Aerosol Duct Sealing”, and “Duct Leakage Testing” factsheets.